

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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In the Matter of)	
)	
Sennheiser Electronic Corporation,)	RM-11821
Request for Amendment of Part 74 of)	
The Commission's Rules to Advance the)	
Use of Spectrum Efficient Wireless)	
Microphone Equipment)	
)	

REPLY COMMENTS OF MICROSOFT CORPORATION

Although the broad outlines of Sennheiser's proposal appear reasonable—reducing intermodulation interference by aggregating multiple independent wireless microphone channels into a single shared channel—responsive comments reveal a number of serious problems. Most significantly, the proposal appears to contemplate WMAS operations in a six-megahertz channel within the duplex gap, but does not explain how this could be possible when Part 74 operations are currently authorized only in a four-megahertz portion of that band. Although the petition seems to disclaim any intention to seek authorization to operate WMAS systems under the separate Part 15 rules for unlicensed wireless microphone by proposing only revisions to Part 74, this loose discussion of operations in the duplex gap and similar remarks about the UHF band raise doubts about Sennheiser's true plans.

Sennheiser's petition also includes no substantial discussion of the interference risks of authorizing wider bandwidth operations. This is especially significant as wireless microphones, including unlicensed Part 15 wireless microphones, benefit from special rules allowing higher

power spectral density than other unlicensed users of the same spectrum in exchange for more restrictive bandwidth limitations.¹ Wireless microphones operate in shared spectrum, including co-channel with White Space devices and broadcast television and directly adjacent to mobile wireless licensees in the 600 MHz band, making it especially critical to understand the precise technical characteristics of Sennheiser’s proposed operations. As Shure explains, this sort of interference analysis ought to be a “preliminary measure”² in evaluating Sennheiser’s proposal, and there is much work yet to be done to evaluate what technical rules would be necessary to ensure that other operations are adequately protected.³ Indeed, such an interference analysis is typically fundamental to any such request, and is a prerequisite to any potential Commission determination that further consideration of Sennheiser’s petition would be in the public interest. Sennheiser’s petition, however, not only fails to include such an analysis, it makes such an analysis impossible by failing to provide any proposed technical rules or detailed technical characteristics of WMAS operations.

These concerns would be increased exponentially if Sennheiser were to attempt to use this petition to expand the frequencies available to wireless microphones. Although its petition does not go down this road explicitly, it appears to leave the door open to either seeking to authorize Part 74 WMAS operations in additional bands outright—such as the six-megahertz unlicensed portion of the duplex gap where WMAS operations are currently prohibited⁴—or asking the Commission to authorize unlicensed WMAS operations inconsistent with existing technical rules, resulting in substantially higher power levels than other unlicensed devices in the

¹ See 47 C.F.R. § 15.236(d).

² Comments of Shure Incorporated at 4–5, RM-11821 (filed Dec. 28, 2018) (“Shure Comments”).

³ *Id.* at 5.

⁴ See 47 C.F.R. § 74.802(a)(2).

same band. Both would displace White Space operations that currently play a critical and growing role in expanding rural connectivity, to say nothing of the several licensed services that could be impacted, depending on the band. The Commission should ensure that Sennheiser is not permitted to expand the already remarkable rights of wireless microphone operators, at the expense of other valuable services, through the vehicle of an incompletely explained petition. Thus, although Microsoft would have no objection to the Commission's reevaluating its Part 74 technical rules as necessary to permit more efficient operations in frequencies where Part 74 wireless microphones are currently authorized, that inquiry should be sharply limited to avoid granting new spectrum rights or harming other spectrum users. And this inquiry should proceed, if at all, only if Sennheiser is able to justify it at the starting gate with suitable technical analyses and draft technical rules.

The record also reflects widespread agreement that Sennheiser's proposed WMAS rules would not go nearly far enough to ensure that wireless microphones make efficient use of spectrum. Shure argues that WMAS systems should be required to support at least eighteen wireless microphones per six-megahertz channel, compared to the twelve that Sennheiser proposes.⁵ Likewise, Alteros points out—consistent with Microsoft's analysis of Sennheiser's petition⁶—that the Commission should “require a *minimum* of 24 channels of high-quality simultaneous operation of wireless microphones in a given channel.”⁷ In today's spectrum constrained environment, it is simply untenable to allow a wireless microphone system—or *any* commercial system—to tie up six megahertz of valuable low-band spectrum in order to accommodate a handful of 200 kHz narrowband microphones.

⁵ Shure Comments at 4.

⁶ Comments of Microsoft Corporation at 9, RM-11821 (filed Dec. 28, 2018).

⁷ Comments of Alteros, Inc. at 3, RM-11821 (filed Dec. 28, 2018).

Finally, Microsoft agrees with Alteros that the Commission should ensure that any new rules would be vendor neutral and encourage coordination and interoperability between microphone vendors.⁸ In particular, the ability of microphones from different vendors to plug into a single WMAS at a venue will lead to more efficient use of the limited UHF spectrum. Otherwise, venue operators conceivably might need to request multiple 6 MHz channels — one WMAS for each microphone vendor's equipment, which would represent highly inefficient use of spectrum.

Respectfully submitted,

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⁸ *Id.* at 4.

CERTIFICATE OF SERVICE

I hereby certify that, on this 8th day of February, 2019, a copy of the foregoing pleading
was served via First Class mail upon:

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